



UPS Airlines

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Weather Delay Impact to Cargo Customer Service

- **Weather impacts all aspects of the Air Cargo Operation.**
 - UPS Meteorology Department is focused on the operational and time-critical nature of service commitments.
- **Canceling flights is not an option.**
 - Our service commitments are guaranteed. If we do not meet the service commitment the delivery is free.
- **Satisfied customers = Growth in Business = Employment = Efficient Competitive Economy**



How Taxi Time Effects Cost

- Every Additional Minute to Taxi Time Equates to:

<u>A/C Type</u>	<u>Gal/Min</u>	<u>Avg. Origin Fuel</u>	<u>\$ Cost per Min</u>
B757	6.4	\$3.56	\$22.80
B767	7.2	\$3.56	\$25.60
A300	9	\$3.56	\$32.00
MD11	16.4	\$3.56	\$58.40
B747-4	21.3	\$3.56	\$75.80

Average Per Minute Taxi Cost UPS Fleet = \$42.90

117 SDF Flights X \$42.90 = \$5020/Minute

\$5020 X 4 Nights Full Launch = \$20,100

\$20,100 X 52 Weeks = \$1,050,000/Year



How Flight Time Effects Cost

- Every Additional Minute to Flight Time Equates to:

<u>A/C Type</u>	<u>Gal/Min</u>	<u>Avg. Origin Fuel \$</u>	<u>Cost per Min</u>
B757	18	\$3.56	\$64.10
B767	26	\$3.56	\$92.60
A300	29	\$3.56	\$103.20
MD11	40	\$3.56	\$142.40
B747-4	48	\$3.56	\$170.90

Average Per Minute Cost UPS Fleet = \$114.60

117 Flights X \$114.60 = \$13,400/Minute

\$13,400 X 4 Nights Full Launch = \$53,600

\$53,600 X 52 Weeks = \$2,780,000/Year



How Arrival Delays at SDF Hub Affect Costs

- **Cost Per Minute Late Arrival into SDF Hub = \$812**
(Cost is for Hub Workers Only, does not include Support Staff or, Downstream Impact)

\$812 Per Minute Late Per Flight
1 Flight 15 Minutes Late = \$12,180



Summary: Costs Per Minute for Weather Delays

- **For Every Taxi Minute = \$42.90**
- **For Every Minute Enroute = \$114.60**
- **For Every Minute Into SDF Hub = \$812.00**



Quantify Costs/Benefits of Weather Forecast Decisions

- Relatively easy to quantify number of minutes late due to weather.
- Hard part is quantifying AVOIDABLE weather delays.
- Good Forecast → Understand Operational Impact (UPS Meteorologist) → Communicate Risk Effectively to Decisionmakers → Make Operational Changes that Reduce the Impact and Cost.
- Costs of Doing Nothing vs. Taking Action.
- With new forecast tools, takes time to gain confidence in tool and then to make effective operational changes.



Decision Threshold Determined by Costs/Benefits

Example 1: Deicing SDF Departure fleet for Frost

- Costs \$50,000 to pretreat entire fleet
- Getting caught by surprise Costs 100 departures 10 minutes delay each. Down line costs \$1 Million
- Breakeven Cost/Benefits Ratio 20:1 or 5%
- Operational Decisions made at only 10% Risk of Frost
- Occurs 30-50 times each winter at SDF



Frost Example

- Expected Frost to pre-treat 100 aircraft requires 20-25 deice trucks and 40-50 people taken from the hub. No flight delays.
- Surprise Frost requires additional 30 deice trucks and additional 60 people (100-110 total), plus costs 10 minute delay each flight. (\$1M approximate cost)



Decision Threshold Determined by Costs/Benefits

Example 2: Intermediate Fog Risk

- SDF-FSD-YYC flight with fog risk at FSD.
- Extra section flight set up SDF-FSD so that SDF-YYC operates direct. Costs \$16,000 to operate extra section, avoiding \$130,000 in Service Failures.
- Breakeven Cost/Benefits Ratio is 130:16 or 12%.
- 30% Risk of below-minimums fog at FSD triggers extra section.
- This occurs 30-50 times every year at UPS.



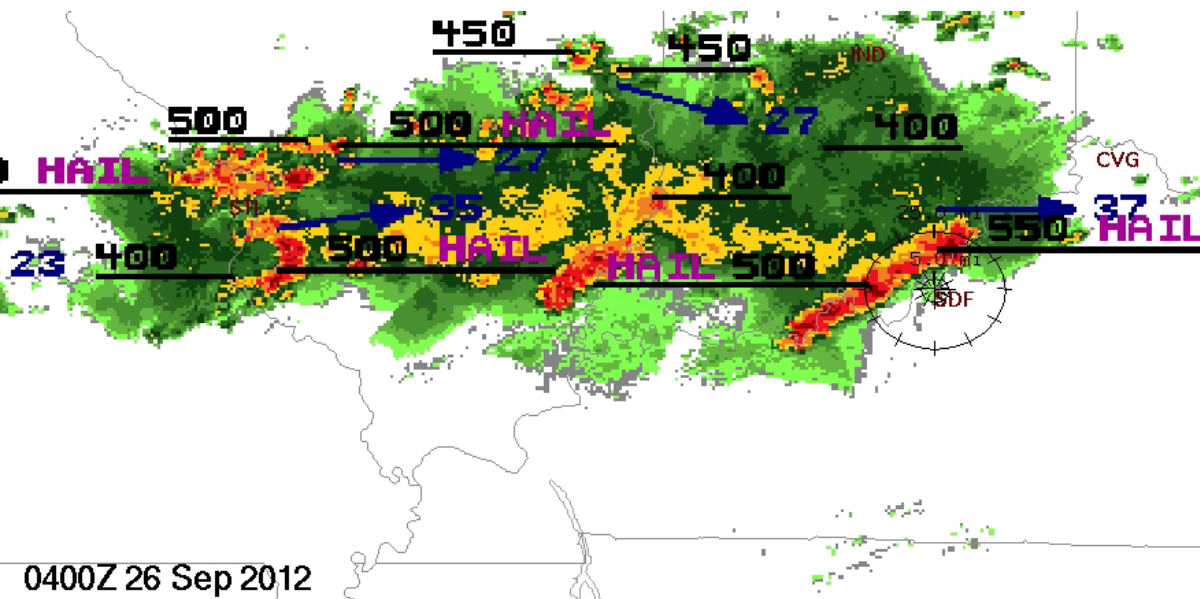
Decision Threshold Determined by Costs/Benefits

Example 3: Spreading out Hub Arrivals due to Severe Adverse Weather during Arrivals (T-storms/Winter Storm)

- Direct Costs \$1 Million
- Potentially Avoids \$2 Million Costs and/or 100,000 Service Failures (10% of Volume)
- Successful Forecast must be accurate within 30 minutes 5-8 hours in advance, at 65%+ Confidence Level



- 3 times this year, UPS used a self-managed ground delay program to reduce the number of arrivals as T-storm line crossed SDF. Result: No Diversions, but averaged 30-45 minutes late for departures.
 - Indy Center/SDF Tower give us a lowered arrival rate, UPS manages the rest.
 - In the past, we would send all the flights on schedule, loaded with as much gas as possible, and end up with 5-20 diversions out of 117 flights.



Decision Threshold Determined by Costs/Benefits

Example 4: The Popsicle

- Example: Forecast Freezing Rain at PDX with strong winds.
- Conditions exceed deicing capabilities. Trying to operate results in crew timing out and aircraft stranded, sometimes for days.
- Aircraft not available cost – averages \$32,000/day .
- Cost of service failures (~\$500,000)
- Best option is to relocate aircraft to BFI (Seattle), truck volume to BFI and fly it out of there.



Avoidable Weather Delays

- Large, Complex Networks must be flexible.
- Forecast must meet the needs of the users/decisionmakers.
- Users/decisionmakers must have confidence in the forecasts. 2 or 3 consecutive busts will stifle proactive weather decisions.
- Large, Complex Networks change over the years. Past baseline metrics may not be applicable today.





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